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# ARMY TECHNICAL INTELLIGENCE REVIEW

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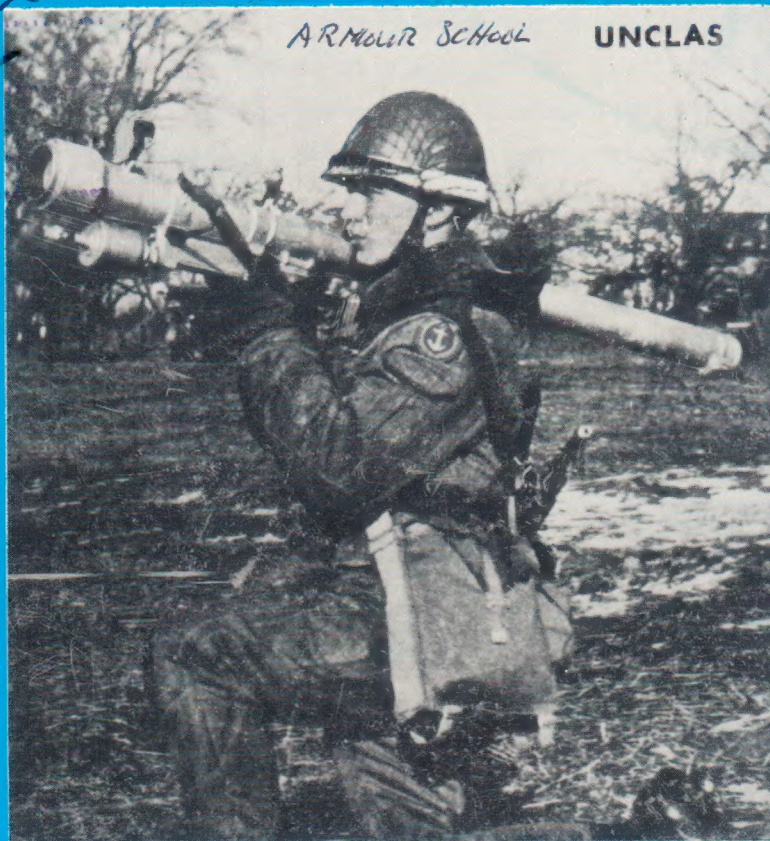
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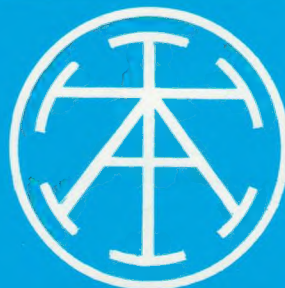
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INDEX

	Page
Foreword	2
1. Rockets used by Irregular Forces	3
2. Soviet SAM Systems	7
3. Israeli 5.56 mm Assault Rifle GALIL	11
4. Box Body Spotting	15
5. Czech Army Military Bridging Equipment	21
6. Foreign Army Weapons and Equipment Quiz	25
7. Crossword	29
Total No Pages	30

Cover Picture: SA-7 in use in Polish Army



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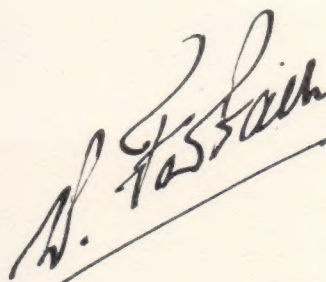
ARMY TECHNICAL INTELLIGENCE REVIEW No 104 (RESTRICTED)

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FOREWORD

The activities of irregular forces continue to be of major interest to us all so the article on their use of rockets is particularly timely. There is also a comprehensive review of Soviet SAM systems and details of the new Israeli produced GALIL assault rifle. The article of Czech Army Bridging equipment gives some indication of the considerable effort devoted by members of the Warsaw Pact other than the Soviet Union to this type of equipment. The study of the many variations of Box Body fitted to Soviet and other vehicles can be a dull and often frustrating business. The article on these vehicles seeks to dispel some of the mystery and put the subject into perspective.

Finally, I have decided to abandon the custom followed by my predecessors of giving news of staff changes within the Branch. The personalities will, in general, not be known to the majority of readers of this publication and those few who are interested will get the same information from the relevant part of the annual Shrivenham Journal.

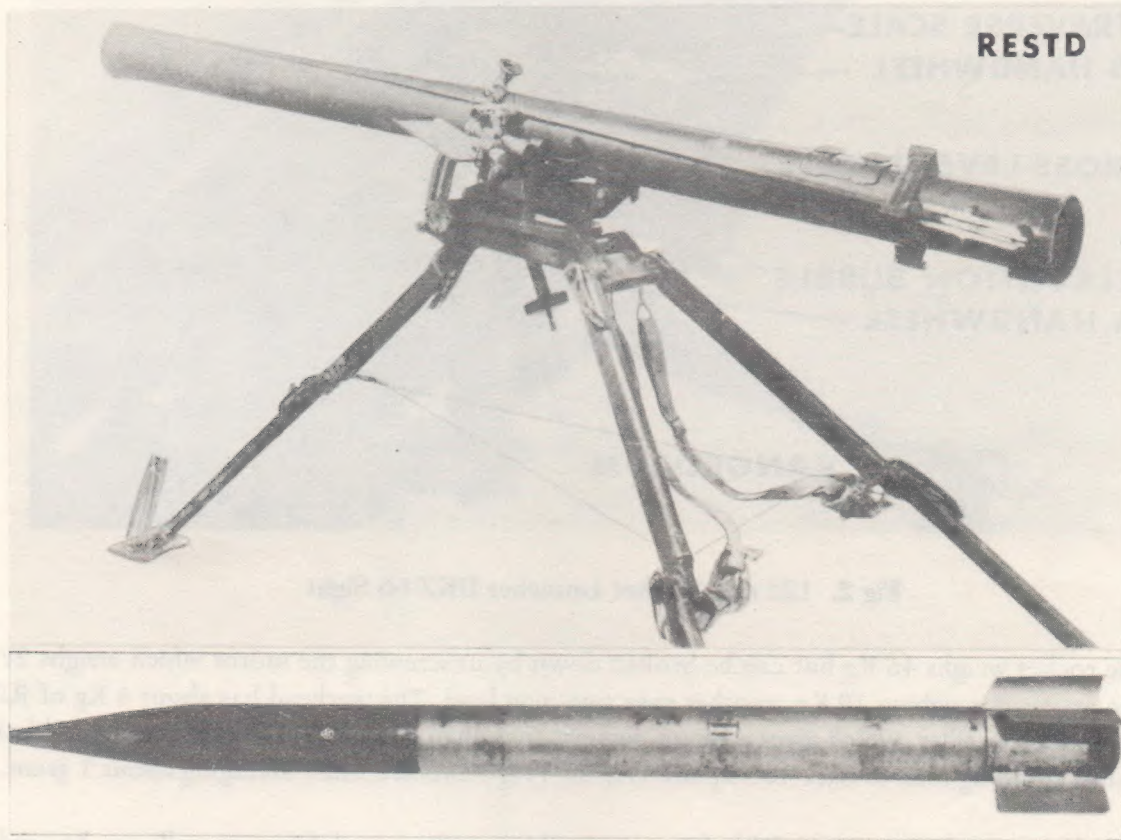
A handwritten signature in dark ink, appearing to read 'W. A. H. Fairbairn', written in a cursive style with a horizontal line underneath.

W A H FAIRBAIRN  
Colonel  
Tech Int (A)

# 1. ROCKETS USED BY IRREGULAR FORCES

This subject was covered in some detail in ATIR 98 (Restricted) of October 1970, so the intention now is to bring that information up to date, and not to repeat it.

The use of rockets as a means of bringing a heavy weight of fire onto a target without having to use heavy towed guns has increased enormously in the last two years in the Middle East and in Africa with guerrilla forces.

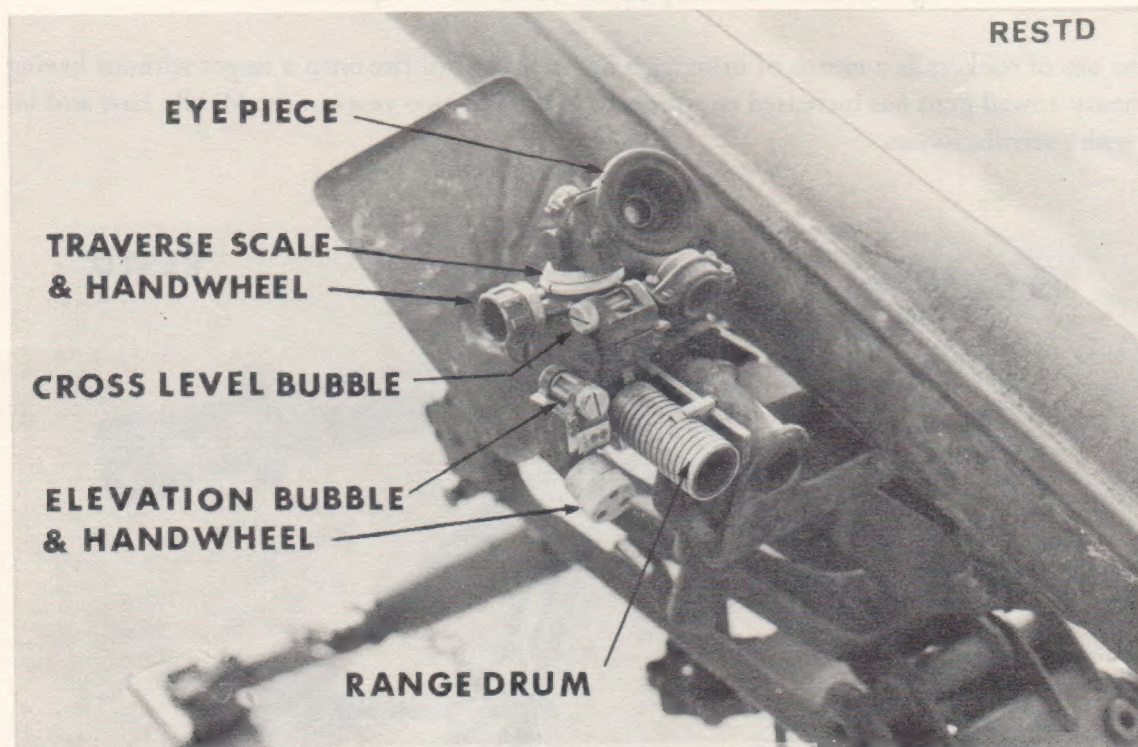


**Fig 1. 122 mm Tripod Mounted Launcher DKZ-66 and 122 mm Rocket (6 ft)**

The one that features most is the 122 mm 6 ft rocket and the single tube tripod launcher DKZ-66 (Fig 1). We now know that this rocket can achieve a maximum range of 10,800 m, where its CEP or 50% zone has been found to be about 300 m, which is accurate for a rocket at this range.



The complete launcher weighs 49.4 Kg, and when broken down the tripod weighs 22.1 Kg, and the tube 27.3 Kg, so it can be carried by two men. The launcher has a modified gun sight (Fig 2) so it can be laid as accurately as a gun. It can be brought into action in about two minutes.



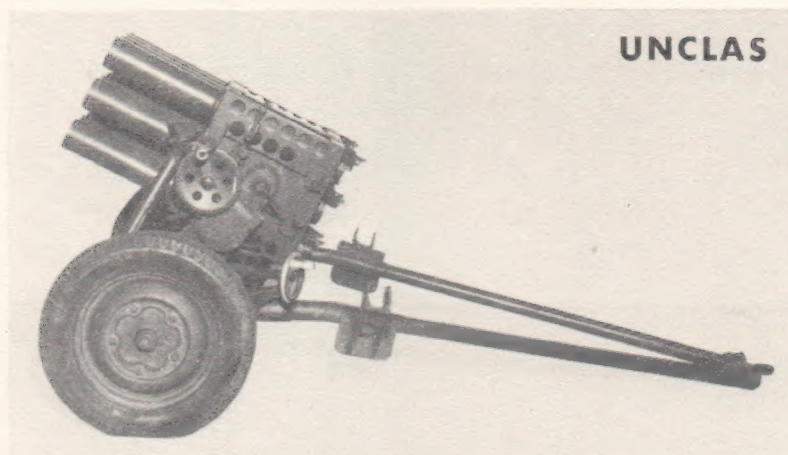
**Fig 2. 122 mm Rocket Launcher DKZ-66 Sight**

The rocket weighs 46 Kg but can be broken down by unscrewing the motor which weighs 27 Kg from the warhead weighing 19 Kg, another easy two man load. The warhead has about 6 Kg of RDX/TNT/Al explosive filler, which gives a better performance than straight TNT with a very good lethal area against standing men of over 400 square metres. Fragments are small averaging about 1 gram.

If men or animals are not available for carrying the launcher, sand dunes or walls can be used for launching the rockets, but these improvisations will tend to decrease the accuracy.

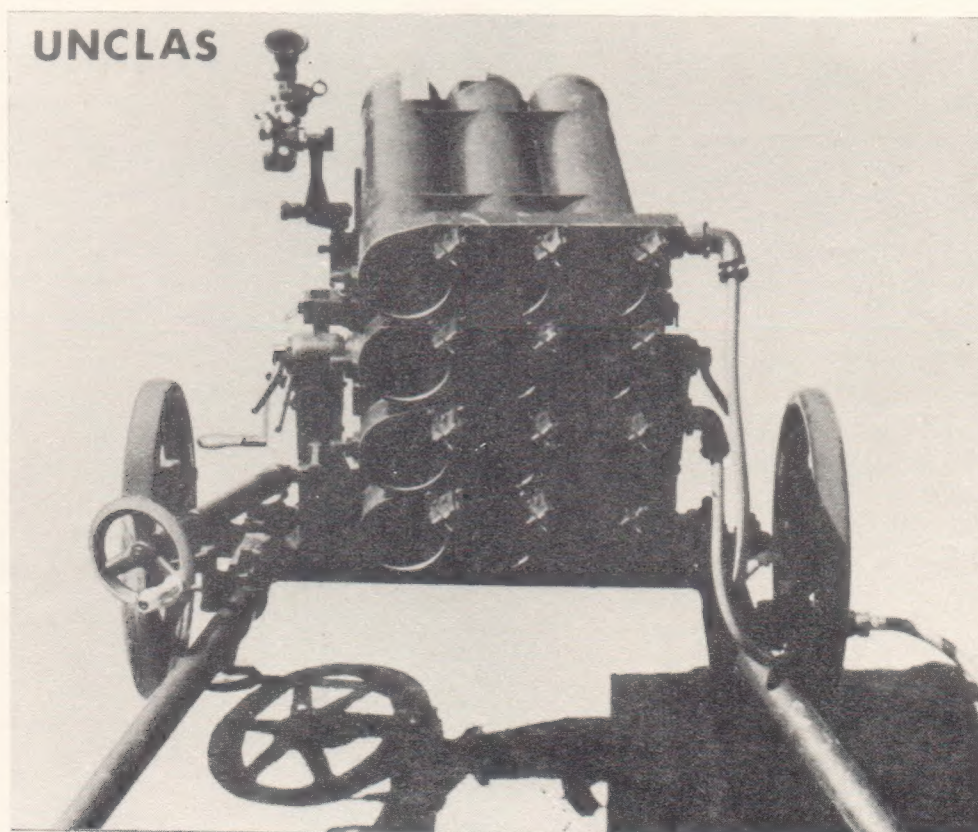
The other rocket launcher which has been seen largely in Vietnam but also in Albania and North Korea is the Chinese 107 mm RL (12 Rd) Type 63. The wheeled launcher (Fig 3) weighs 372 Kg but has the same launcher assembly as that seen in ATIR 98. Each two tube assembly weighs 21.7 Kg which is a one man load and each rocket weighs 19 Kg, another one man load. The warhead weighs 6.7 Kg and contains 1.3 Kg of TNT which gives it a good lethal area of over 350 square metres against standing men. It fires to a maximum range of 8300 m where the dispersion is about 100 m CEP.





**Fig 3. Chinese 107 mm RL (12 Rd) Type 63 – Wheeled Version**

The latest Chinese launcher seen is this lightweight version made of cast aluminium which the Chinese call Type 63-1 (Fig 4). The whole launcher only weighs 147 Kg, each three tube assembly 26.4 Kg and as can be seen the tubes have been turned through 90° so that there are four rows of three instead of three of four. This has made it about 13 inches narrower than the Type 63. Its performance is believed to be the same as the Type 63.



**Fig 4. Chinese 107 mm (12 Rd) Type 63-1**





## 2. SOVIET SAM SYSTEMS

### Introduction

The Soviet Union and the other Warsaw Pact countries place great stress on the air defence of their homeland and of their field armies. To achieve this, they have developed and deployed a wide variety of surface to air missile (SAM) systems.

The SA-2 (GUIDELINE), still the most widely deployed of all SAM systems was followed by the SA-3 (GOA) system with an improved low level capability. The emphasis then moved to the defence of the field armies and in the past six years we have seen the introduction of two mobile tracked systems, SA-4 (GANEF) and SA-6 (GAINFUL) and a man portable, shoulder launched system SA-7 (GRAIL).

The combination of these SAM systems and air defence artillery, gives the Warsaw Pact forces an extensive operational capability against aircraft targets.



## SA-2



Fig 1. GUIDELINE Missile on Launcher

## SA-2

The Soviet SA-2 SAM system is a medium altitude, medium range air defence system which was developed in the early 1950s and first deployed about 1957.

The system is standard equipment within the Warsaw Pact forces and is probably the most widespread of all SAM systems having been exported to many other countries including Cuba, Indonesia, Egypt and North Vietnam.

The major components of the system are the GUIDELINE missile and the FAN SONG fire control radar, there being several known variants of each.

The GUIDELINE missile (Fig 1) which is about 10.7 metres long is command guided and has a solid propellant boost motor with a liquid propellant sustainer motor.

The system is land mobile, the missile transporter being a special semi trailer pulled by a ZIL 157V tractor truck.



SA-3

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Fig 2. GOA Missile Transporter

SA-3

The SA-3 SAM system is a low to medium altitude air defence system. The major components of the system are the GOA missile and the LOW BLOW fire control radar.

The GOA missile which is about 6 metres in length is a two stage tandem missile using solid propellant motors in both booster and sustainer.

The missile transporter (Fig 2) is based on the standard ZIL 157 truck and carries two GOA missiles on a parallel pair of beams which are attached to a tubular framework mounted on the truck.

SA-4

The SA-4 is a mobile field army SAM system first shown in the Moscow 1964 parade.

Two GANEF missiles (Fig 3) are mounted on the armoured tracked launcher from which they can be raised into the firing position. The system is thus highly mobile, and is air transportable in such aircraft as the AN-22 freighter.

The GANEF missile is about 9 m long, and is a two stage missile with four wrap around solid propellant boost motors and a ram jet sustainer.



Fig 3. GANEF Transporter Erector Launcher (TEL)



## SA-6

The SA-6 system is another field army SAM system first shown in the November 1967 Moscow parade, and is a low to medium altitude, medium range mobile system.

Three GAINFUL missiles (Fig 4) are mounted on a tracked TEL. The missiles are about 6 m in length and unlike other Soviet SAM systems are mounted facing rearwards on the tracked TEL.

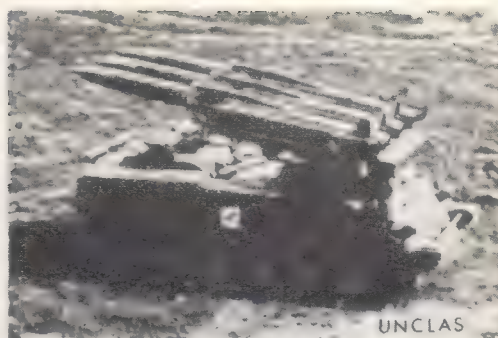


Fig 4. GAINFUL TEL

## The SA-7 SAM System

SA-7 is a man portable, shoulder launched, infra red homing, surface to air missile system similar in concept to the American RED EYE weapon system.

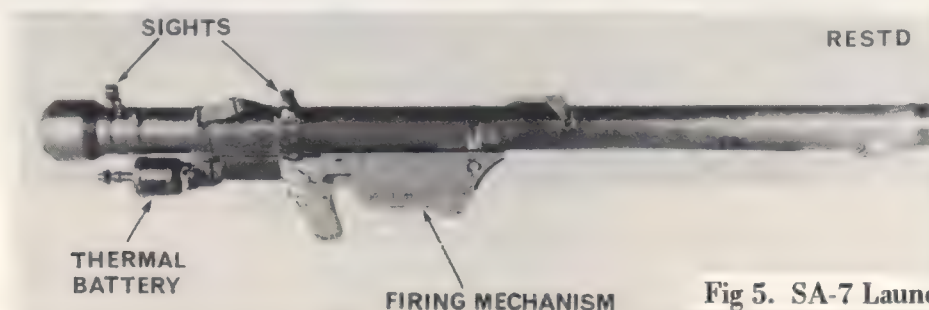


Fig 5. SA-7 Launcher

The GRAIL missile employs infra-red passive guidance in that it homes in onto heat sources from the target aircraft. The SA-7 launcher (Fig 5) is about 1.4 m long and weighs just over 13 Kg when loaded with the GRAIL missile. The launcher which is a one shot device is fitted with folding optical sights and a detachable firing mechanism which may be reused with other launch tubes. The slant range of the system is about 3-4 km..

The system was first reported in Egypt in 1969, and next appeared in Vietnam in April 1972 where it met with considerable initial success against slow flying fixed wing aircraft and helicopters, until the introduction of counter-measures effectively reduced the loss rate.

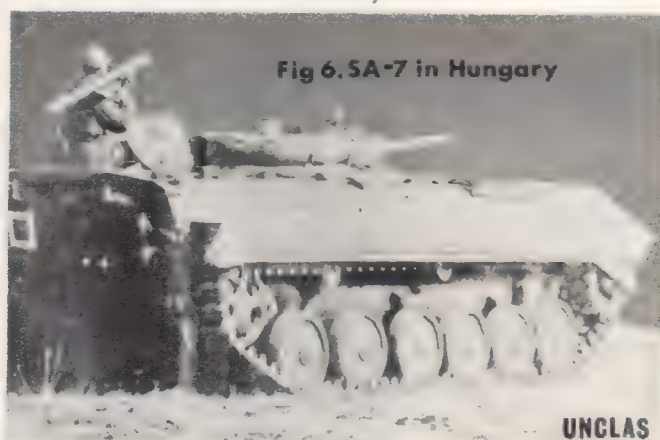


Fig 6. SA-7 in Hungary

In November 1972 a photograph (Fig 6) was published in the Hungarian Army Newspaper showing a soldier holding what is thought to be a training version of the SA-7 sitting on the back of a BMP. Further evidence that the SA-7 system is deployed in the Warsaw Pact Armies comes from the Polish press (See cover photograph).



### 3. ISRAELI 5.56mm ASSAULT RIFLE 'GALIL'

In April this year, Israel revealed to the world its "solution to the problem of providing the soldier of the Seventies with the ideal personal arm" — the 5.56 mm Assault Rifle GALIL. There are two versions available — the Assault Rifle (AR or ARM) (Fig 1) which will serve the infantry section as a sub-machine gun, rifle and light machine gun, and the Short Assault Rifle (SAR) (Fig 2) which is intended for use by special forces and police.



Fig 1. 5.56 mm Assault Rifle GALIL (AR or ARM)



Fig 2. 5.56 mm Short Assault Rifle GALIL (SAR)

The weapon is gas operated, capable of semi-automatic and automatic fire, and without the use of an adaptor it can be used to launch grenades. The standard magazine holds 35 rounds, but there is one with a 50 round capacity and a third which holds 12 cartridges for launching grenades. It is considered that the 50 round magazine, because of its length is primarily for use when the bipod legs are folded ie in the rifle or SMG role.



Additional features include:

- a. The choice of butt – either folding tubular metal skeleton type or a solid wood fixed butt which would probably be used with weapons employed as LMG's.
- b. A wire-cutter incorporated in the bipod (Fig 3).
- c. Facilities for left and right-handed firers which include:
  - (1) A cocking handle (Fig 1) protruding upwards so that it is easily reached from the left side.
  - (2) A change lever (Fig 1) on either side of the receiver (the lever on the right-hand side is similar to that of the AK-47).
  - (3) A magazine catch (Fig 1) which can be operated by either thumb.
- d. A bottle opener (this is included to prevent misuse of other parts of the weapon; we are uncertain about its actual location).



**Fig 3. GALIL and Accessories**

The SAR differs from the AR in that it has a shorter barrel and does not have a bipod or carrying handle.

Now take a long hard look at GALIL alongside the Finnish 7.62 mm M-62 (Fig 4), and the Soviet 7.62 mm AK-47 (Fig 5). The receivers of all 3 weapons are very similar – well, we know that M-62 was based on AK-47 and we suggest that GALIL relies heavily on M-62 for its basic design. It is also suspected that the internal parts compare very closely with those of the M-62 or AK-47. The flash hider is similar to that on the US 5.56 mm rifle M-16A1.



Fig 4. Finnish 7.62 mm Assault Rifle M-62



Fig 5. Soviet 7.62 mm Assault Rifle AK-47

Table of Comparison Page 14



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Taking those figures which are available for GALIL we have prepared a brief table of comparison with two larger calibre Soviet weapons and one US weapon of the same calibre. It should be remembered however, that a true comparative evaluation would take a lot more into account than just these details.

FEATURE	GALIL (AR) (ISRAEL)	AK-47 (USSR)	AKM (USSR)	M-16A1 (US)
Calibre (mm)	5.56	7.62	7.62	5.56
Weight (Kg)	4.15 <sup>(1)</sup>	4.3 <sup>(2)</sup>	3.26 <sup>(2)</sup>	3.13 <sup>(3)</sup>
Length (cm)	98	88	88	99
Magazine Capacity (Rounds)	35(50)(12)	30	30	20
Muzzle Velocity (m/s)	960	715	715	990
Cyclic Rate of Fire (Rounds/min)	650	600	600	700-900
Range (m) <sup>(4)</sup>	500 (plus)	400	400	460

## NOTES:

1. With bipod: less magazine
2. With steel magazine (empty).
3. With alloy magazine (empty).
4. Combat Range.



## 4. BOX BODY SPOTTING

In our youth many of us will have been avid collectors of car, lorry or bus registration numbers or, perhaps, keen train spotters. Such youthful enthusiasms are frequently carried on into adult life, though few of us would happily admit it, and, in the Intelligence world, the most recent outlet for such latent enthusiasms is Soviet Bloc Box Body Spotting – a craze which has been gaining in popularity over the last few years. There are, in fact, considerable numbers of known Box Body types to “collect” and it is most gratifying when one becomes the first spotter to spot a new one!

### RESTD



**Fig1. R-811M Airfield Control Radio Van on ZIL-130 Chassis**

**What is a Box Body?** A typical example of a Soviet Box Bodied Vehicle (BBV) is shown in Fig 1. The United Kingdom has Box Bodies in her Army although we call them Detachable Container Bodies, and, when mounted on flatbed vehicles, they fit quite snugly and look very much part of the basic vehicle. The same is true in the Soviet and Warsaw Pact Armies, but they have a far greater variety of Box Bodies than we have – round topped, flat topped, “loaf” shaped (with rounded corners) and chamfer-roofed – with a multitude of different roles.

**On what Vehicle Chassis can we see Box Bodies?** In the Soviet Army the principal Box Body carrier vehicle is ZIL-157, with increasing numbers of the same boxes now being seen mounted on its successor, ZIL-131. Other Soviet vehicles used as BBV include: GAZ-63, GAZ-66, KrAZ-214, KrAZ-255B, MAZ-200, MAZ-500, MAZ-502, UAZ-452, URAL-375, ZIL-130 and ZIL-164. A few of the older types of Box Body are still seen mounted on the basically obsolete GAZ-51, ZIL-150 and ZIL-151 chassis. The East German Army, as well as using a number of Soviet BBV, mount Box Bodies on their G-5, ROBUR LO-1800A, and W-50LA/A chassis. The Polish Army utilises its STAR series vehicles whilst the Hungarians use their CSEPEL range, particularly D-344. In the Czech Army a few BBV based on the old PRAGA-V3S are seen, but none, as yet, on the more prolific TATRA vehicles. The Rumanians and Bulgarians apparently use only Soviet BBV.



**What functions do BBV perform?** The functions of Soviet and Warsaw Pact Box Bodied Vehicles are legion but the great majority fall into relatively few categories:

**Workshop Vans.** The largest group. A typical East German workshop van based on URAL-375 is shown in Fig 2.



**Fig 2. URAL-375 Workshop Van (East German Army)**

**Radio Vehicles.** Vehicle mounted radio stations are the second largest group. As well as Fig 1 which shows the ZIL-130 based R-811M radio station, we have included photographs of the GAZ-63 based R-118 BM-3 station (Fig 3) and a STAR-660 based Polish radio station, (Fig 4).



**Fig 3. Radio Station R-118 BM-3 on GAZ-63 (East German Army)**



**Fig 4. A Polish STAR-660 mounted Radio Van**



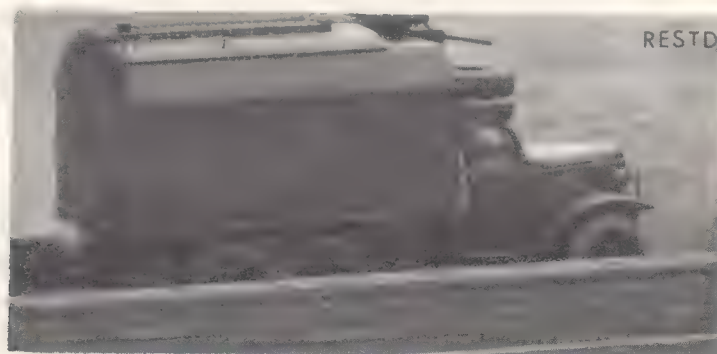
**Radio/Radar Direction Finding and Electronic Warfare Equipment.** Also a large category. A typical radio DF van is featured in Fig 5, this one being based on ZIL-157.

RESTD



**Fig 5. A frequently seen Radio Direction Finding Vehicle (East German Army)**

**Vehicle mounted Radars and Radar associated Vans.** A smaller group typified by the ZIL-157 mounted Soviet P-15 radar shown in Fig 6.



**Fig 6. A Soviet P-15 Radar mounted on ZIL-157 (Soviet Army)**

**Vehicle mounted Generators.** The BBV fleet includes a number of generator vehicles. An example, again ZIL-157 based, is shown in Fig 7.

RESTD



**Fig 7. A ZIL-157 Radio Relay Generator Vehicle (East German Army)**

**Command Post/Communication Centre Vehicles.** A fairly large category. Fig 8 shows a typical East German Operations Centre van.



**Fig 8. A ROBUR LO-1800A Operations Centre BBV (East German Army)**

In addition to those already covered there is the inevitable "Miscellaneous" category which includes general purpose vans, ambulances, NBC decontamination vehicles, missile control systems, meteorological stations, survey vehicles, field simulators, propaganda loudspeaker vans, stores carrying vehicles, vehicle mounted field cooking equipment (mobile field kitchens) etc. Figs 9 and 10 show respectively a GAZ-66 clothing decontamination vehicle and the PAK-200 mobile field kitchen on the ZIL-131 chassis.



**Fig 9. A GAZ-66 Clothing Decontamination Vehicle (East German Army)**





**Fig 10. One of three versions of the Soviet Mobile Field Kitchen PAK-200 mounted on the ZIL-131 chassis (Soviet Army)**

**How do we identify and categorise BBV?** Box Body identification is, above all, an expertise born of experience, but there are good identification guides for both beginner and expert alike. The first, and most used, is a guide produced by Headquarters United States Army Europe which contains line drawings of some 475 known Box Body designs, the function of many of which have also been identified. This guide, USAREUR Pam 30-60-7, is, for the major part, unclassified, and is on issue to intelligence collectors and analysts throughout the NATO forces in Europe. Together with the classified recognition key produced by 6 Intelligence Company (PI) it forms the primary source of identification of known BBV. In fact a working knowledge of these guides also gives the budding Box Body spotter a good grounding for the categorisation of new BBV – and these are seen quite frequently – since many external features of a known specialist Box Body will be carried through onto a newer body with a similar function.

**Conclusion.** Box Body spotting, as well as satisfying the collectors instinct of the average adult male, often serves a very useful intelligence purpose. Correct, fast categorisation of a BBV will frequently give a good lead to the identification of the type of unit in which it is seen, whether that unit is occupying an installation, or on the move, perhaps going to, or coming from, an exercise location. It could under some circumstances also point to the presence of new equipment in an already well established unit. It can, in fact, be altogether a most rewarding pastime.

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## 5.CZECH ARMY MILITARY BRIDGING EQUIPMENT

During the past few years the Czechoslovak People's Army has developed a wide range of military bridging equipment for the crossing of both wet and dry obstacles.

There is a relatively high density of narrow barriers in Central Europe. To cross these while in contact with the enemy, they have developed the MT-55 tank launched scissors bridge (Fig 1). This 18 metre long bridge can be launched in 1-2 minutes by the crew which is protected by the T-55A tank chassis.

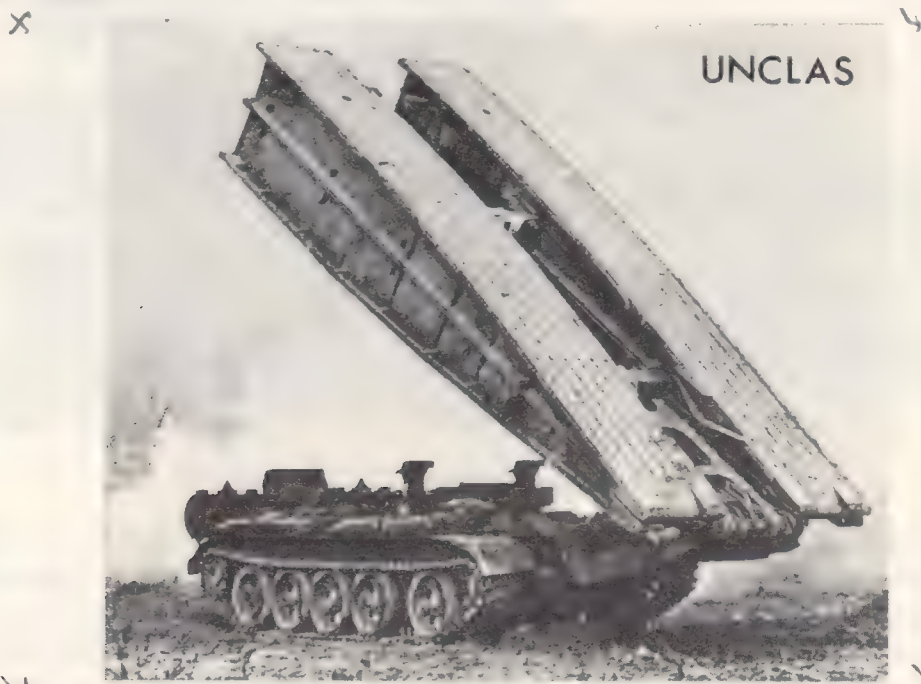


Fig 1. MT-55 Tank Launched Scissors Bridge

Following the initial or assault waves, tactical or combat support bridges are required to assist the main body. Figure 2 shows a new truck launched scissors bridge of this type. The bridge, which is carried on and launched from a TATRA-813 truck, has integral telescopic trestles and can be connected in succession with other spans to provide as long a bridge as desired.



Fig 2. TATRA-813 Mounted Scissors Bridge M1972

To cross wide, deep water barriers the Czechs use the Soviet Heavy Folding Pontoon Bridge PMP which they call PMS. A section of PMS is shown in Figure 3 being transported on a TATRA-813 BZ-D. This is a very useful vehicle because, in addition to carrying and launching the bridge section, it can prepare bridge approaches and launching sites. The vehicle also has an impressive cross-country performance.

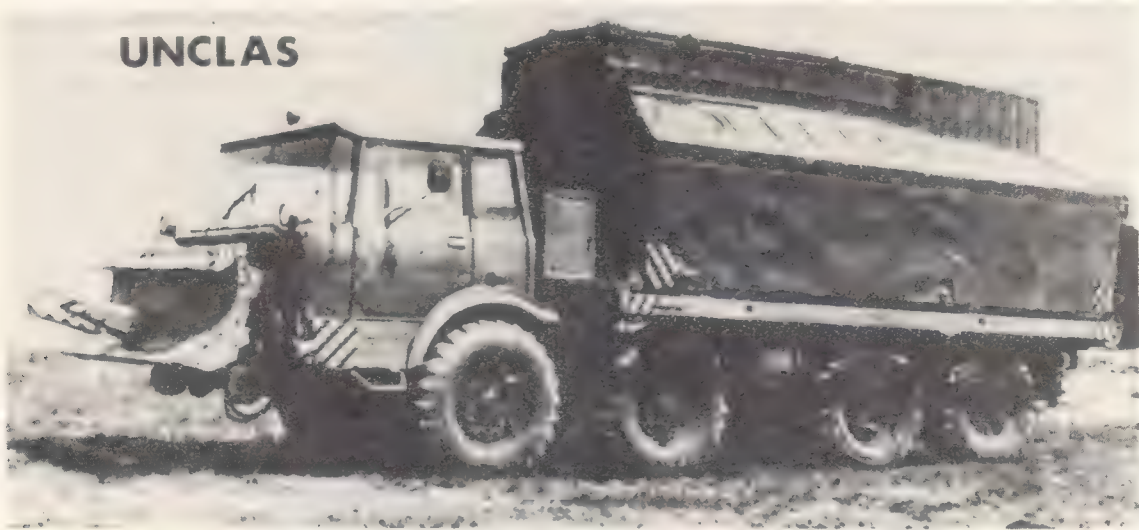


Fig 3. PMS Shore Section on TATRA-813 BZ-D

The Medium Truss Bridge MS is used for bridging dry gaps longer than 18 metres and rivers too shallow to use floating bridges. Three sections of the bridge, each consisting of two load carrying girders, transoms, kerbs and decking, are transported on a TATRA-111 or TATRA-138 load carrying vehicle. In order to save space the sections are folded flat on the back of the vehicle and opened before being used on the bridge. Bridge sets are provided with collapsible piers which support the bridge when crossing wide gaps. A bridge using piers is shown in Figure 4. The bridge has a 60 tonne capacity over a span of 21 metres.



Fig 4. MS Medium Truss Bridge with Intermediate Pier



The largest bridge in the Czech inventory is the TMS Heavy Panel Bridge which is a line of communication bridge replacing the Bailey Bridge. Figure 5 shows a double single construction which is 45 metres long and has a capacity of 100 tonnes.

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Fig 5. TMS Heavy Panel Bridge

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## **6. FOREIGN ARMY WEAPONS AND EQUIPMENT QUIZ**

Some more photographs for you to identify.

We have also included a small crossword for you to solve.



1. Here's one for all the family. How many equipments can you name? Four is the maximum and that does not include the Flag.

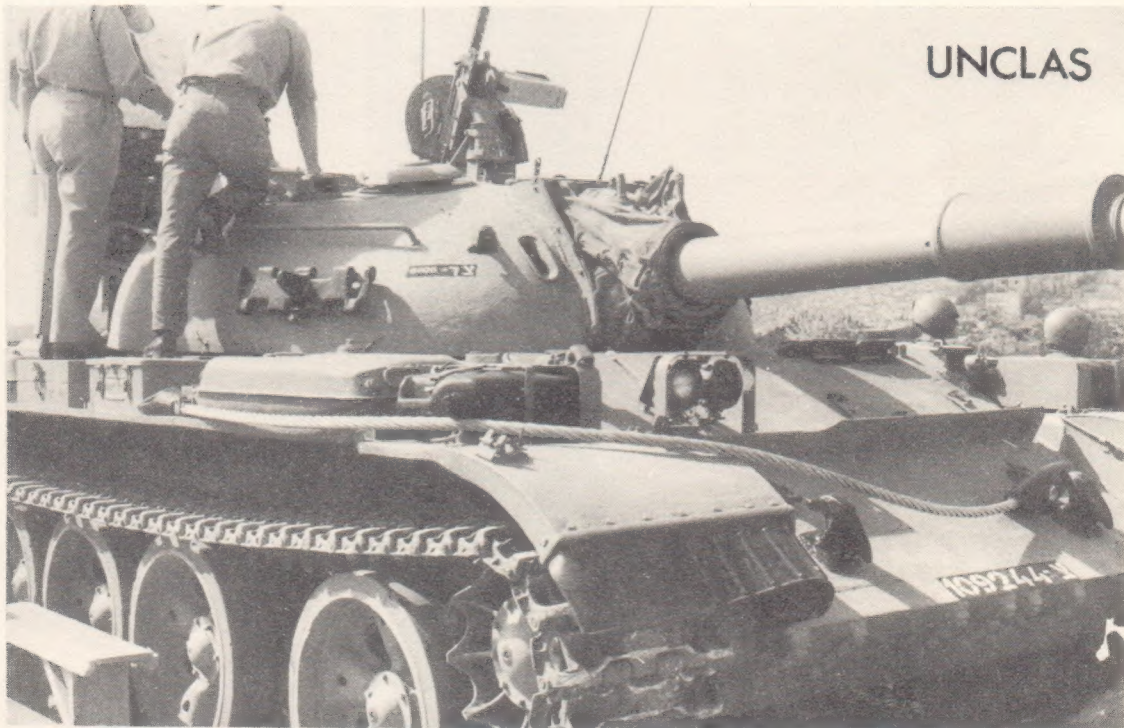


2. Expensive way to get rid of insects!  
Can you name the vehicle and the missiles?





- X
3. "Digging in"? Or warding off the screaming hordes? What is Sergei doing?
- X

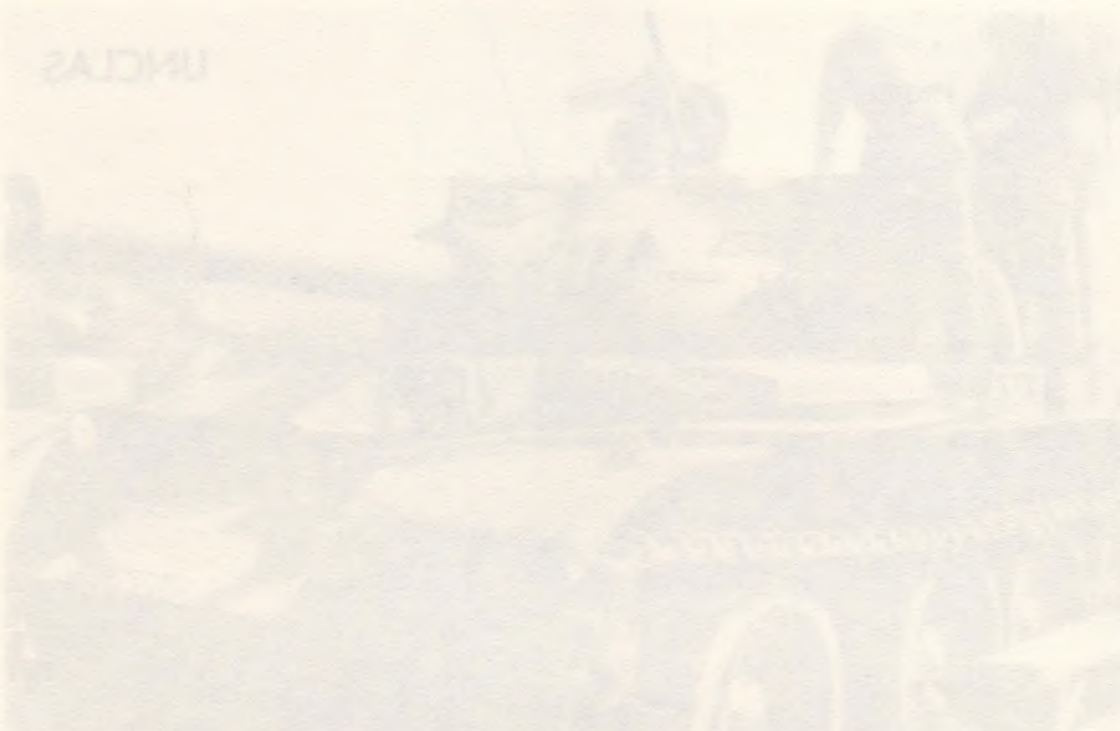


- f
4. Too easy or is it? Take a good look. What country would dare to do this?
- X



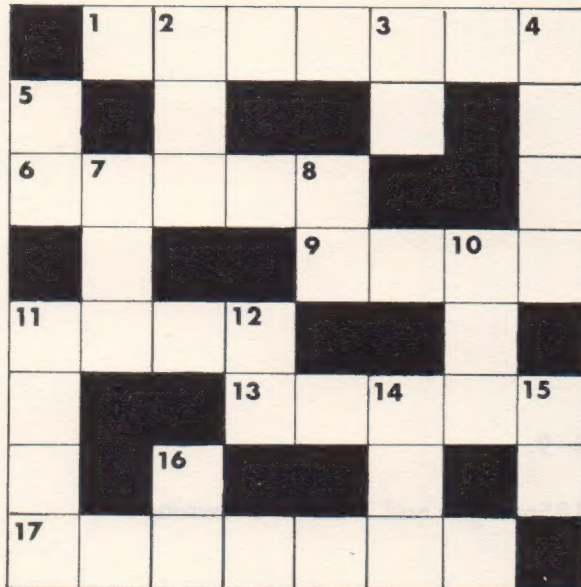


5. A Safari Park Vehicle. No, but what is it?





# 7. CROSSWORD



## CLUES ACROSS

1. See 10 down (7)
6. Disturb a tart to find this Czech truck (5)
9. A type of Soviet heavy truck (4)
11. See 11 down.
13. A group of twinkling Polish vehicles? (5)
17. A pair of containers on the GAZ-66 could have a passive intercept role (4,3)

## CLUES DOWN

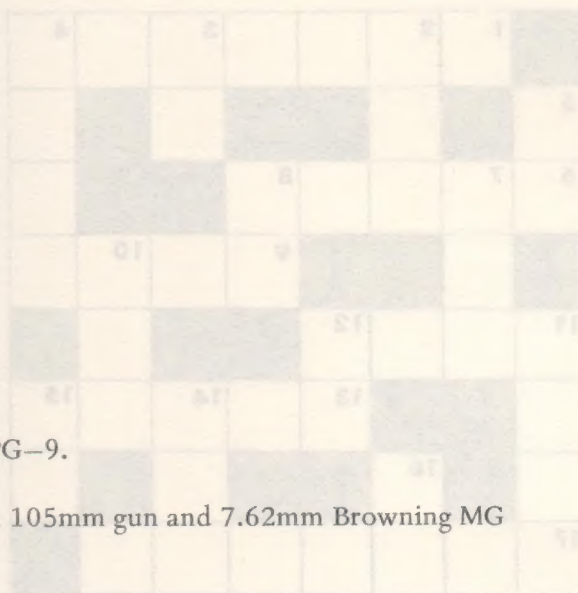
2. A soft skinned tracked vehicle you may see at a road junction? (3)
3. This emplaced flamethrower certainly sounds like an enemy one (2)
4. A light Soviet jeep. More like fifty heavier ones? (4)
5. Followed by seventy-six others can this Soviet tank swim? (2)
7. One of ours over there – particularly if tech-nically parenthesised (3)
8. He is out of fish for this well known Soviet rifle (2)
10. 1 across is a surface to this missile (3)
11. (followed by 11 across). An air defence radar with particularly level features? (4, 4)
12. A quarter kilo under this makes an East German military motor cycle (2)
14. A light truck from far off Roumania (3)
15. Turn us around to see an old Soviet Assault gun (2)
16. Defence Intelligence comes in last? Yes, this time! (2)

(See Page 30 for answers)

# Foreign Weapons and Equipment Quiz

## Answers

1. Soviet ZSU-23-4  
Polish T-55 Tank  
Polish PP-64 Bridge  
Polish KH-200 Motor Tug
2. SWATTER on BRDM
3. Preparing to load the Soviet Recoilless Gun SPG-9.
4. A Soviet T-54/55. Israeli version with British 105mm gun and 7.62mm Browning MG
5. Soviet R-125M Radio Station in UAZ-69.



## ANSWERS (Crossword)

### ACROSS

1. GAINFUL
6. TATRA
9. KRAZ
11. FACE
13. STARS
17. TWIN BOX

### DOWN

2. ATT
3. FO
4. LUAZ
5. PT
7. AMA
8. AK
10. AIR
11. FLAT
12. ES
14. ARO
15. SU
16. DI